

RECEIVED  
CENTRAL FAX CENTER

MAR 17 2008

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the application:

Listing of Claims:

Claim 1 (currently amended): An apparatus for producing secondary electrons, comprising:

at least one primary electrode for producing primary electrons;

an acceleration electrode for accelerating the primary electrons; and

a secondary electrode for producing secondary electrons when the accelerated primary electrons arrive, said secondary electrode having at least one aperture opening formed therein, ~~[[the]]~~ walls of said at least one aperture extending obliquely to ~~[[the]]~~ a surface of said secondary electrode;

said at least one aperture opening having an aperture direction configured at an angle defined by:  $\tan(90^\circ - w) = d/b$ ; and

w is said angle, d is a thickness of said secondary electrode, and b is a width of said at least one aperture opening.

Applic. No. 10/718,777

Response Dated March 17, 2008

Responsive to Office Action of December 17, 2007

Claim 2 (previously presented): The apparatus according to claim 1, wherein:

said aperture opening prevents primary electrons from passing through.

Claim 3 (currently amended): The apparatus according to claim [[2]]25, wherein said aperture opening is formed by an elongated hole defined by side surfaces configured parallel to one another.

Claim 4 (original): The apparatus according to claim 2, wherein:

said aperture opening is defined by side surfaces that overlap in a direction at which the primary electrons arrive into said aperture opening.

Claim 5 (previously presented): The apparatus according to claim 3, wherein:

said secondary electrode has a surface in which said aperture opening is formed;

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

said surface has a normal; and

said side surfaces of said aperture opening are configured,  
aligned with said normal.

Claim 6 (original): The apparatus according to claim 2,  
wherein said aperture opening is formed by laminates.

Claim 7 (previously presented): The apparatus according to  
claim 1, wherein:

said at least one aperture opening has an aperture direction  
configured at an angle of a magnitude of between 30° and 70°  
with respect to a normal of said secondary electrode near said  
aperture opening.

Claim 8 (original): The apparatus according to claim 7,  
wherein:

said angle has a magnitude of 55° with respect to the normal  
of said secondary electrode near said aperture opening.

Claim 9 (canceled)

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

Claim 10 (previously presented): The apparatus according to claim 1, wherein:

said secondary electrode has side walls defining said aperture opening;

said side walls are spaced a distance apart; and

said distance between said side walls is between 2 mm and 6 mm.

Claim 11 (original): The apparatus according to claim 10, wherein said distance between said side walls is 4 mm.

Claim 12 (original): The apparatus according to claim 1, wherein:

said at least one primary electrode includes only one primary electrode.

Claim 13 (currently amended): ~~The apparatus according to claim 1, further comprising:~~ An apparatus for producing secondary electrons, comprising:

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

a plurality of primary electrodes for producing primary electrons;

an acceleration electrode for accelerating the primary electrons;

a secondary electrode for producing secondary electrons when the accelerated primary electrons arrive, said secondary electrode formed with a plurality of aperture openings, walls of at least one aperture extending obliquely to a surface of said secondary electrode;

each one of said plurality of primary electrodes associated with a respective one of said plurality of aperture openings; and

at least one of said plurality of aperture openings being at a different inclination angle than another one of said plurality of aperture openings.

Claim 14 (previously presented): The apparatus according to claim 1, wherein:

said secondary electrode is made of aluminum or of an aluminum alloy.

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

Claim 15 (original): The apparatus according to claim 1,  
wherein:

said secondary electrode is made of Al 99 or of an even purer  
aluminum.

Claim 16 (previously presented): The apparatus according to  
claim 1, wherein:

said secondary electrode is made of graphite or contains at  
least 60% by mass of graphite.

Claim 17 (previously presented): The apparatus according to  
claim 1, wherein:

said secondary electrode is made of aluminum oxide.

Claim 18 (currently amended): ~~The apparatus according to~~  
~~claim 1, wherein:~~ An apparatus for producing secondary  
electrons, comprising:

at least one primary electrode for producing primary  
electrons;

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

an acceleration electrode for accelerating the primary  
electrons; and

a secondary electrode for producing secondary electrons when  
the accelerated primary electrons arrive;

said secondary electrode ~~[[has]]~~ having a mean surface  
roughness of between 5 and 8  $\mu\text{m}$ .

Claim 19 (original): The apparatus according to claim 1,  
wherein:

said acceleration electrode is formed with at least 100  
openings.

Claim 20 (original): The apparatus according to claim 1,  
wherein:

said acceleration electrode is formed at least 500 openings.

Claim 21 (original): The apparatus according to claim 1,  
wherein:

said acceleration electrode is formed with at least 1000  
openings.

Applic. No. 10/718,777

Response Dated March 17, 2008

Responsive to Office Action of December 17, 2007

Claim 22 (original): The apparatus according to claim 19,  
wherein:

said acceleration electrode includes a wire mesh having at  
least 100 holes or meshes.

Claim 23 (original): The apparatus according to claim 1,  
wherein:

said acceleration electrode is formed with at least 100  
openings; and

said acceleration electrode is made of aluminum or an aluminum  
alloy.

Claim 24 (original): The apparatus according to claim 1,  
wherein:

said acceleration electrode is formed with at least 100  
openings; and

said acceleration electrode is made of Al 99.9 or an even  
purer aluminum.



Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

Claim 25 (currently amended): ~~The apparatus according to claim 1, wherein:~~ An apparatus for producing secondary electrons, comprising:

at least one primary electrode for producing primary electrons;

an acceleration electrode for accelerating the primary electrons; and

a secondary electrode for producing secondary electrons when the accelerated primary electrons arrive;

said acceleration electrode ~~[[is]]~~ being formed with at least 100 openings; and

said secondary electrode ~~[[has]]~~ having a mean surface roughness; and

said acceleration electrode ~~[[has]]~~ having a mean surface roughness of less than said mean surface roughness of said secondary electrode.

Claim 26 (original): The apparatus according to claim 25, wherein:

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

said mean surface roughness of said acceleration electrode is  
between 2.5 and 6  $\mu\text{m}$ .

Claim 27 (original): The apparatus according to claim 1,  
further comprising:

a free space for an ion beam to pass through; and

a workpiece;

said ion beam being directed at said workpiece.

Claim 28 (original): The apparatus according to claim 27,  
wherein said workpiece is a semiconductor substrate.

Claim 29 (original): The apparatus according to claim 1,  
further comprising:

a free space used for holding a material or workpiece to be  
processed.

Claim 30 (original): The apparatus according to claim 1,  
further comprising:

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

a free space for an ion beam to pass through;

said primary electrode configured parallel to a propagation direction of said ion beam.

Claim 31 (original): The apparatus according to claim 1, further comprising:

a free space for an ion beam to pass through;

said primary electrode configured transversely with respect to a propagation direction of said ion beam.

Claim 32 (currently amended): An apparatus for producing secondary electrons, comprising:

at least one primary electrode for producing primary electrons; and

a secondary electrode for accelerating the primary electrons;

said secondary electrode formed with at least one aperture opening for preventing primary electrons from passing through, ~~[[the]]~~ walls of said at least one aperture extending obliquely to ~~[[the]]~~ a surface of said secondary electrode;

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

said at least one aperture opening having an aperture  
direction configured at an angle defined by:  $\tan(90^\circ - w) =$   
 $d/b$ ; and

w is said angle, d is a thickness of said secondary electrode,  
and b is a width of said aperture opening.

Claim 33 (canceled)

Claim 34 (currently amended): The apparatus according to  
claim ~~[[32]]~~49, wherein said aperture opening is formed by an  
elongated hole defined by side surfaces configured parallel to  
one another.

Claim 35 (previously presented): The apparatus according to  
claim 32, wherein:

said aperture opening is defined by side surfaces that overlap  
in a direction at which the primary electrons arrive into said  
aperture opening.

Claim 36 (previously presented): The apparatus according to  
claim 34, wherein:

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

said secondary electrode has a surface in which said aperture opening is formed;

said surface has a normal; and

said side surfaces of said aperture opening are configured aligned with said normal.

Claim 37 (previously presented): The apparatus according to claim 32, wherein said aperture opening is formed by laminates.

Claim 38 (original): The apparatus according to claim 32, wherein:

said aperture opening has an aperture direction configured at an angle of a magnitude of between 30° and 70° with respect to a normal of said secondary electrode near said aperture opening.

Claim 39 (original): The apparatus according to claim 38, wherein:

said angle has a magnitude of 55° with respect to the normal of said secondary electrode near said aperture opening.

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

Claim 40 (canceled)

Claim 41 (original): The apparatus according to claim 32,  
wherein:

said secondary electrode has side walls defining said aperture  
opening;

said side walls are spaced a distance apart; and

said distance between said side walls is between 2 mm and 6  
mm.

Claim 42 (previously presented): The apparatus according to  
claim 41, wherein said distance between said side walls is 4  
mm.

Claim 43 (original): The apparatus according to claim 32,  
wherein:

said at least one primary electrode includes only one primary  
electrode.

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

Claim 44 (currently amended): ~~The apparatus according to claim 32, further comprising:~~ An apparatus for producing secondary electrons, comprising:

a plurality of primary electrodes for producing primary electrons;

~~said a~~ secondary electrode formed with a plurality of aperture openings for accelerating the primary electrons;

said secondary electrode formed with at least one aperture opening for preventing primary electrons from passing through, walls of said at least one aperture extending obliquely to a surface of said secondary electrode;

each one of said plurality of primary electrodes associated with a respective one of said plurality of aperture openings; and

at least one of said plurality of aperture openings being at a different inclination angle than another one of said plurality of aperture openings.

Claim 45 (original): The apparatus according to claim 32, wherein:

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

said secondary electrode is made of aluminum or of an aluminum alloy.

Claim 46 (original): The apparatus according to claim 32, wherein:

said secondary electrode is made of Al 99 or of an even purer aluminum.

Claim 47 (original): The apparatus according to claim 32, wherein:

said secondary electrode is made of graphite or contains at least 60% by mass of graphite.

Claim 48 (original): The apparatus according to claim 32, wherein:

said secondary electrode is made of aluminum oxide.

Claim 49 (original): ~~The apparatus according to claim 32,~~  
~~wherein:~~ An apparatus for producing secondary electrons,  
comprising:



Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

at least one primary electrode for producing primary  
electrons;

a secondary electrode for accelerating the primary electrons;

said secondary electrode formed with at least one aperture  
opening for preventing primary electrons from passing through;  
and

said secondary electrode ~~[[has]]~~ having a mean surface  
roughness of between 5 and 8  $\mu\text{m}$ .

Claim 50 (original): The apparatus according to claim 32,  
further comprising:

a free space for an ion beam to pass through; and

a workpiece;

said ion beam being directed at said workpiece.

Claim 51 (original): The apparatus according to claim 50,  
wherein said workpiece is a semiconductor substrate.

Applic. No. 10/718,777  
Response Dated March 17, 2008  
Responsive to Office Action of December 17, 2007

Claim 52 (original): The apparatus according to claim 32,  
further comprising:

a free space used for holding a material or workpiece to be  
processed.

Claim 53 (original): The apparatus according to claim 32,  
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured parallel to a propagation  
direction of said ion beam.

Claim 54 (original): The apparatus according to claim 32,  
further comprising:

a free space for an ion beam to pass through;

said primary electrode configured transversely with respect to  
a propagation direction of said ion beam.

Claim 55-62 (canceled)